

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In Chapter 2, we have discussed about the covering array notations which are CA, MCA, VCA and CCA. Besides, the literature review has focused on the existing t-way Testing Generators which are Deterministic Tools and Non-deterministic Tools. The algorithms that detail discussed under deterministic tools are IPO and DDA while ACA, GA and HS are detail discussed under Non-deterministic tools. In this chapter, we are going to discuss the software development methodology in order to complete the research to build a T-way Testing : A Test Case Generator Based on Melody Search Algorithm (MS). The hardware and software required to complete this research will be specified in this chapter too.

Software development methodologies or known as Method of Software Development Life Cycle (SDLC) is a well-planned systematic process in software development which normally starting from planning, data analysis, implementation and lastly end with maintenance. Some common used Software development methodologies like Waterfall Model, Rapid Application Development (RAD) Model, Agile Model, Iterative Model, V Model, Incremental Model, and Spiral Model are being designed and used in different software development so to achieve different requirements and goals. After analysis on the research requirements, the methodology implemented in this research is Rapid Application Development (RAD) Model.

3.2 METHODOLOGY

Rapid Application Development (RAD) Model was proposed by James Martin, 1980s. It is an incremental development model for those project with well-understood requirements and delivered within short period and scalable (B. Prashanth Kumar, 2014). Figure 9- 3.1 shows the main phases in RAD Model.

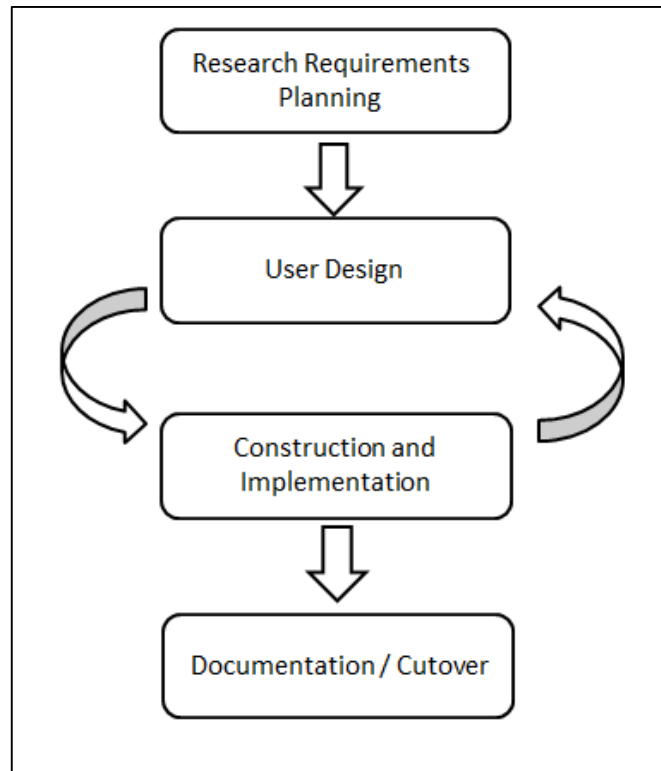


Figure 9 - 3.1 Phases of Rapid Application Development (RAD) Model

3.2.1 Phase 1 : Research Requirements Planning

The objective and the purpose of the research on t-way testing generating tool based on Melody Search Algorithm (MS) is being analyzed. Its requirements and resources have been planned also. It is being built to support higher interaction strength (t) up to $t=4$ with customize values of parameter. Development tool is using java based Netbeans IDE version 8.0.2.

Study of literature review is being carried out in this phase too. Existing t-way Testing Generators is classified into deterministic tools and non-deterministic tools. The existing algorithm strategies of deterministic tools are In-Parameter-Order (IPO) (Shiwei Gao, 2014) and Deterministic Density Algorithm (DDA) (Charles J. Colbourn, n.d.) while the existing algorithm strategies of non-deterministic tools are Ant Colony Algorithm (ACA) (Toshiaki Shiba, 2004), Genetic Algorithm (GA) (Prof. K.S. Sharma, 2011) and Harmony Search Algorithm (HS) (M.Aghaie, 2013). They are being compared in terms of the supporting interaction strength (t) of each other.

Besides, the types of covering array notations are being discussed in this phase also. They consist of Covering Array (CA), Mixed Covering Array (MCA), Variable-strength Covering Array (VCA) and Constraints Covering Array (CCA). After the evaluation, this research is implementing Mixed Covering Array (MCA) which supporting customize amount of values for each parameter.